

REDESCRIPTION OF THE HOLOTYPE OF *CULEX (CULEX) PEUS* SPEISER
AND TAXONOMY OF *CULEX (CULEX) STIGMATOSOMA* DYAR
AND *THRIAMBUS* DYAR (DIPTERA: CULICIDAE)

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Abstract.—Examination and redescription of the holotype *Culex (Culex) peus* Speiser 1904 (substitute name for *affinis* Adams 1903) established that it is conspecific with *Cx. thriambus* Dyar 1921. Therefore, *Cx. thriambus* is synonymized under *peus*; *Culex stigmatosoma* Dyar 1907 is resurrected from synonymy; and *Cx. eumimetes* Dyar and Knab 1908 is transferred to synonymy under *stigmatosoma*. This paper also clarifies identification of these species in the literature.

Key Words: *Culex*, *affinis*, *eumimetes*, *peus*, *stigmatosoma*, *thriambus*, taxonomy, redescription

While studying the *Culex (Culex)* of Central America, I noticed several differences between descriptions (Adams 1903, Stone 1958) of the holotype of *Culex peus* Speiser 1904 (= *affinis* Adams 1903) and other specimens and descriptions of the species. As a result, I undertook a study with the purpose of identifying the holotype. Since the holotype is a damaged female adult from Arizona, I examined female adult specimens of *Cx.* (standard abbreviation for *Culex*, Reinert 1975) *peus* and the similar species, *Cx. thriambus* Dyar 1921, with the objective of finding diagnostic characters still present on the holotype of *Cx. peus*. Examination of specimens was limited to the United States in order to assure that the specimens belonged to one of the two species involved and not to a possibly undescribed form from Mexico or Central America.

The study established that the holotype of *Cx. peus* is conspecific with *Cx. thriambus*. As a result, *Cx. thriambus* is made a synonym of *Cx. peus*. Furthermore, *Cx. stigmatosoma* Dyar 1907 is resurrected from

synonymy with *Cx. peus*. *Culex eumimetes* Dyar and Knab 1908 is transferred from synonymy under *Cx. peus* to synonymy under *Cx. stigmatosoma*. Specimens identified as *Cx. peus* since Stone (1958) are actually *Cx. stigmatosoma*, and specimens identified as *Cx. thriambus* are *Cx. peus*.

The holotype of *Cx. peus* is redescribed in this paper in much greater detail than by Adams (1903) or Stone (1958). This detailed description was considered necessary because of the central role of the holotype in the nomenclature of the species involved. The redescription documents characters that are not currently known to be significant, but which could conceivably influence future taxonomic decisions. Since the holotype is already damaged, redescription helps assure that any future deterioration will not result in permanent loss of characters.

METHODS

Evaluation of color on the holotype of *Cx. affinis* was based on comparison of the specimen to color samples of the four-color

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printing process. The color samples (Kueppers 1982) present mixtures of black (B), cyan (C), magenta (M), and yellow (Y) in all combinations of three of the colors against a white page at 10% intervals (i.e. percentage coverage of the page with minute dots used in color printing). A particular color is designated as a combination of the percentage of each of the color inks (e.g. B₁₀M₂₀C₉₀ is a sky blue color). Each color sample was viewed surrounded by a gray mat under unfiltered tungsten light. For color evaluation, the specimen was also viewed under unfiltered tungsten light set at 5 volts. Unfortunately, the same color may appear as more than one combination of inks and, the human eye is much more sensitive to certain color ranges, such as light yellow, than the 10% intervals can identify. Therefore, light yellow scales have been called "yellowish" in the description. Nevertheless, the system is useful because it provides an objective reference to color and a measurement of color that is reproducible on a printed page.

Abbreviations and notations require some explanation. The symbols "♂" and "♀" represent adults of the respective sex. The symbol "♂G" is male genitalia. Fourth instar larva is represented by "L" and pupa is represented by "P." An asterisk indicates that the stage was illustrated in the cited paper. Where possible, collection or specimen numbers were reported to allow location of the exact specimen examined. All specimens are in the U.S. National Museum (USNM) unless otherwise noted (UAz = University of Arizona, SEM = Snow Entomological Museum, University of Kansas). Morphological nomenclature and abbreviations were taken from Harbach and Knight (1980).

TAXONOMY

Culex peus Speiser

Culex peus Speiser, 1904: 148, replacement name for *affinis* Adams.

Culex affinis Adams, 1903: 25, Oak Creek

Canyon, Arizona, USA, ♀, SEM; Coquillett 1904: 261, synonymized under *Cx. tarsalis*; Theobald 1907: 394, synonymy questioned.

Culex thriambus Dyar, 1921: 33, Kerrville, Texas, USA, ♂, USNM. **New Synonymy**; Dyar 1928: 368, synonymized under *stigmatosoma*; Edwards 1932: 206, listed as var. of *stigmatosoma*; Galindo and Kelley 1943: 87, resurrected.

Additional descriptions.—*Cited as Cx. peus*: Stone 1958 (♀). *Cited as Cx. thriambus*: Dyar 1921 (♂, ♀, ♂G, L). Dyar 1922 (♀, ♂, L); Galindo and Kelley 1943 (♀, ♂G, L); Freeborn and Brookman 1943 (♀, L); Freeborn and Bohart 1951 (♀, ♂G, L); Breland 1957 (L); Martinez Palacios 1952 (♂, ♀, ♂G*, L); Usinger et al. 1952 (♀, L); Bohart and Washino 1957 (2nd and 3rd instar L); Carpenter and LaCasse 1955 (♀*, ♂, ♂G*, L*); Dodge 1963 (L); Nielsen and Linam 1963 (♀, L); Myers 1964 (L); Forattini 1965 (♀, ♂G, L); Chapman 1966 (♀, ♂G, L); Cova Garcia et al. 1966a (♀, ♂G*); Cova Garcia et al. 1966b (L*); Dodge 1966 (1st instar L); Mukherjee et al. 1966 (chromosomes* of L); Bram 1967 (♀, ♂G*, L); Nielsen 1968 (♀, ♂G, L); McDonald et al. 1973 (♀); Bohart and Washino 1978 (♀*, L*); Darsie and Ward 1981 (♀*, L*); Clark-Gil and Darsie 1983 (♀, L).

Material examined (all adult females).—Arizona: Coconino Co.: Oak Creek Canyon, holotype, F. H. Snow. Cochise Co.: St. David, 24 Sep 1953, C. S. Richards, 2 ♀. Maricopa Co.: Wickenburg, 29 Jun 1953, W. W. Wirth. Pima Co.: Lake Sabino Canyon, 20 Oct 1962, J. Burger coll. no. 349, 5 ♀; 17 Nov 1962, coll. no. 353; 17 Nov 1962, coll. no. 357, 2 ♀; 10 Mar 1963, coll. no. 373, 3 ♀; 20 Apr 1963, coll. no. 378; 26 May 1963, coll. no. 383, 2 ♀; 28 Jun 1963, coll. no. 388; 17 Oct 1963, coll. no. 410, 3 ♀. Pinal Co.: Boyce-Thompson Arboretum, 3 mi. S. of Superior, 7 Jul 1963, J. Burger coll. no. 390, 9 ♀. Santa Cruz Co.: Madera Canyon, 21–26 Aug 1954, W. A. McDonald coll. no.

Table 1. Characters of various populations of *Culex stigmatosoma* and *Culex peus*, including the type specimens, specimens from the states of type localities, and all specimens examined from the United States. Percentages are followed by 95% confidence limits (CL) (Rohlf and Sokal 1969) and means are followed by standard deviations (SD).

Population	Proboscis Band Complete % (CL) (n)	Palpi with White Scales % (CL) (n)	HT-5 with Dark Band % (CL) (n)	Ratio of Basal Band to Length of HT-2 Mean \pm SD (n)
<i>affinis</i> type	yes ^a	no	no ^a	0.06
Arizona <i>peus</i>	24 (10-41) (38)	3 (0-16) (37)	30 (17-52) (33)	0.09 \pm .02 (38)
Texas <i>peus</i>	10 (0-44) (10)	0 (0-29) (11)	22 (3-62) (9)	0.08 \pm .02 (10)
California <i>peus</i>	15 (6-34) (34)	0 (0-11) (34)	42 (25-62) (33)	0.08 \pm .02 (33)
All <i>peus</i>	18 (10-29) (82)	1 (0-8) (82)	35 (24-47) (75)	0.08 ^b \pm .02 (81)
<i>stigmatosoma</i> type	yes	yes	yes	0.15
Arizona <i>stigmatosoma</i>	100 (71-100) (11)	100 (71-100) (11)	100 (65-100) (9)	0.15 \pm .02 (11)
California <i>stigmatosoma</i>	98 (93-100) (127)	100 (97-100) (126)	100 (97-100) (127)	0.13 \pm .02 (128)
All <i>stigmatosoma</i>	98 (93-100) (139)	100 (97-100) (138)	100 (97-100) (137)	0.13 ^b \pm .02 (140)

^a Destroyed on type specimen, extracted from original description (Adams 1903).

^b Significantly different at the 95% level in a t-test of group means.

133, 8 ♀. California: Inyo Co.: China Ranch, 29-30 Oct 1955, Blodget and McDonald coll. no. 177, 10 ♀. Riverside Co.: 1 mi. S. Hurkey Creek Campground, San Jacinto Mts., 9 Apr 1962, C. L. Hogue coll. no. 233, 5 ♀. San Bernardino Co.: Saratoga Springs, Death Valley, 29 Oct 1955, Blodget and McDonald coll. no. 176, 8 ♀. San Diego Co.: Jamacha Junction, 11 Jul 1954, Belkin and McDonald coll. no. 124, 10 ♀. San Luis Obispo Co.: San Luis Obispo, 22 Aug 1948, W. W. Wirth. Shasta Co.: US 299 and Trinity Center Rd., 8 Sep 1950, J. N. Belkin coll. no. 68. Texas: Bexar Co.: San Antonio, 14 Jul 1942, E. S. Ross, 2 ♀. Kerr Co.: Kerrville, 20 Aug 1920, H. G. Dyar coll. no. Y2, coll. no. Y4, coll. no. Y7 (type no. 23926), coll. no. Y π 5 ♀. Travis Co.: Austin, 24 Oct, A. L. Melander.

Diagnosis.—The adult female of *Cx. peus* may be distinguished from *Cx. stigmatosoma* on the basis of characters presented in Table 1. In contrast to *Cx. stigmatosoma*, the proboscis band of *Cx. peus* is usually incomplete; the palpi lack broad, opaque white scales; the dark band in the middle of hindtarsomere 5 is usually absent making this tarsomere completely white; and the width of the basal light band on hindtarsomere 2 is usually less than 0.10 of length of hindtarsomere 2.

Culex peus sometimes has a complete proboscis band and hindtarsomere 5 with a dark band, character states usually associated with *stigmatosoma*. Only three examples out of 81 specimens displayed both these characters. Of these, two (Inyo Co., San Diego Co., CA) were associated with exuviae definitely identified as *Cx. peus*. The third (Riverside Co., CA) was from a collection of more typical adult females of *Cx. peus*. Conversely, three female adults of *Cx. stigmatosoma* displayed an incomplete proboscis band, a character typical of *Cx. peus*. Two of these specimens were from collections of *stigmatosoma*. The third was the sole individual in a collection (Huntington Beach, Orange Co., CA).

Although the proboscis band does not provide complete separation of the species, it is an important character (Table 1). As in other members of the subgenus, light scales on the middle of the proboscis form a band that is either complete or incomplete dorsally. Bands with a narrow dark dorsal line less than one scale wide were considered complete. The bands seem to be the result of a separation of the two sides of the labial sheath, exposing the dark, unscaled stylets within. The majority (82%) of *Cx. peus* had an incomplete proboscis band restricted to the ventral and lateral portions of the la-

bium. Although the proportion of specimens with a complete proboscis band varied from 10% in Texas to 24% in Arizona, the differences between regions were not significant at the 95% level, as judged by confidence limits. Almost all *Cx. stigmatosoma* specimens had complete proboscis bands with a greater density of whiter scales than in *Cx. peus*. There was no consistent difference between the two species in the length of the band.

The presence or absence of white scales on the palpi is a consistent difference between the species (Table 1). Every specimen of *Cx. stigmatosoma* examined had at least several large, opaque, white scales on the dorsal and mesal sides of the apex of the palpi. Often, the scales formed large, distinctive patches. Most *Cx. peus* lacked large, opaque white scales on the palpi. The palpi were either entirely dark scaled, or had small, light, pearly scales on some of the surfaces. Only one specimen had opaque white scales; five scales were on one palpus.

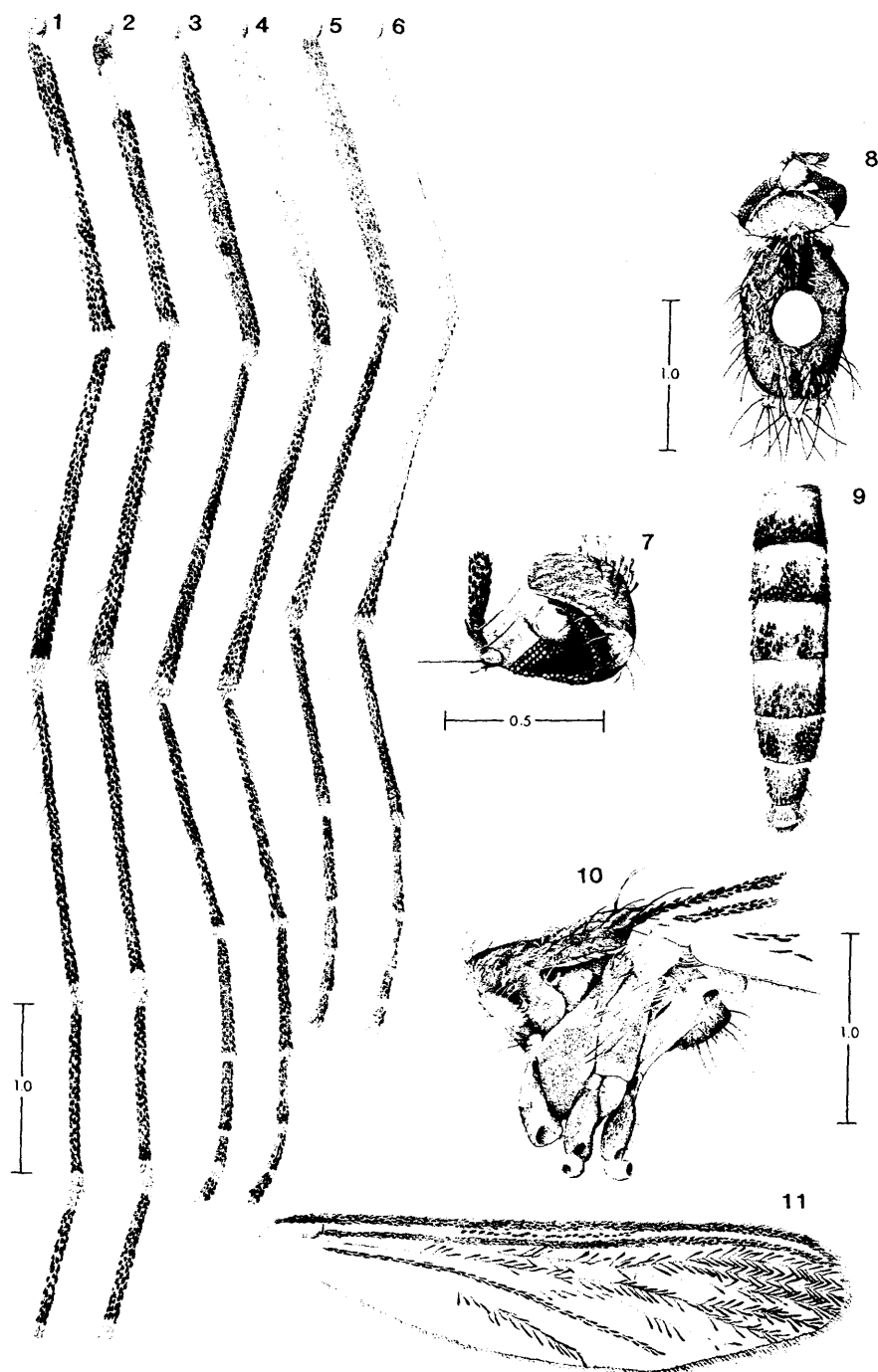
Hindtarsomeres 1–4 of both species were ornamented with white basal and apical bands. Hindtarsomere 5 (HT-5) always followed this same pattern in *Cx. stigmatosoma*, displaying a distinct dark band in the middle of the tarsomere. *Culex peus* varied in this character, with 35% of those examined having HT-5 with a dark band and the remaining specimens with HT-5 all white (Table 1). As in the case of the proboscis band, the proportion of *peus* with the dark HT-5 band varied among populations, but not significantly so. Generally, the dark-scaled portion of HT-5 was not as distinct in *peus* as in *Cx. stigmatosoma*.

Another character useful for separating the two species was the ratio of the width of the basal band to tarsomere length on HT-2 (Table 1). The mean ratio was 0.13 for *Cx. stigmatosoma* and 0.08 for *peus*. There were no significant differences between populations within each species. Figure 12 presents the data as frequency distributions, showing that the central value of

the ratio is different for the two species, though the distributions overlap.

Remarks.—The lectotype of *Cx. thriambus* and associated specimens conform to the description of *Cx. peus* given above. The lectotype was selected by Stone and Knight (1957) from three syntypes designated by Dyar. One female has the same accession number (USNM Type No. 23926) and label information as the type, including Dyar's code "Y7." Seven other females were collected on the same date by Dyar in Kerrville, but have different code numbers. Since it is not clear what Dyar intended by his code numbers (A. Stone, personal communication; search of Smithsonian Archives failed to find relevant notes or letters), the eight females may have come from the same collection despite the application of four different code numbers, lending confidence to the assumption that the females are the same species as the lectotype male. One of the specimens has a dark band on HT-5, six have HT-5 all white, and one lacks HT-5 on both hindlegs (code number Y7, USNM Type No. 23926). All of the females lack white scales on the palpi and have incomplete proboscis bands (one has no proboscis). The mean value for the ratio of the length of the light basal band to the length of HT-2 for seven of the specimens is 0.075 with a range of 0.065 to 0.087.

Redescription of holotype (Figs. 1–11).—*Condition of specimen*: Specimen damaged. On head, proboscis missing up to clypeus except for short segment of single internal stylet. Front of head collapsed horizontally so that vertex overlies pedicels. Scales obviously missing from parts of vertex, though pattern and color of scales still discernible. Antennae broken, all flagellomeres beyond pedicels missing. Damage to thorax caused by original pinning. No. 1 insect pin pierces thorax, obscuring center of scutum and lower right pleuron. Area posterior to pin generally less rubbed of scales and setae than area anterior to pin. Missing portions of legs: left foretrochanter, forefemur, foretibia, and



Figs. 1-11. *Culex peus* Speiser, holotype. All scale bars are in millimeters. 1. Anterior side of hindleg (HT-4, 5 missing). 2. Posterior side of hindleg (HT-4, 5 missing). 3. Anterior side of midleg. 4. Posterior side of midleg. 5. Anterior side of foreleg. 6. Posterior side of foreleg. 7. Lateral view of head. 8. Dorsal view of head and thorax. 9. Dorsal view of abdomen. 10. Lateral view of thorax with small piece of abdominal tergite I. 11. Dorsal view of wing.

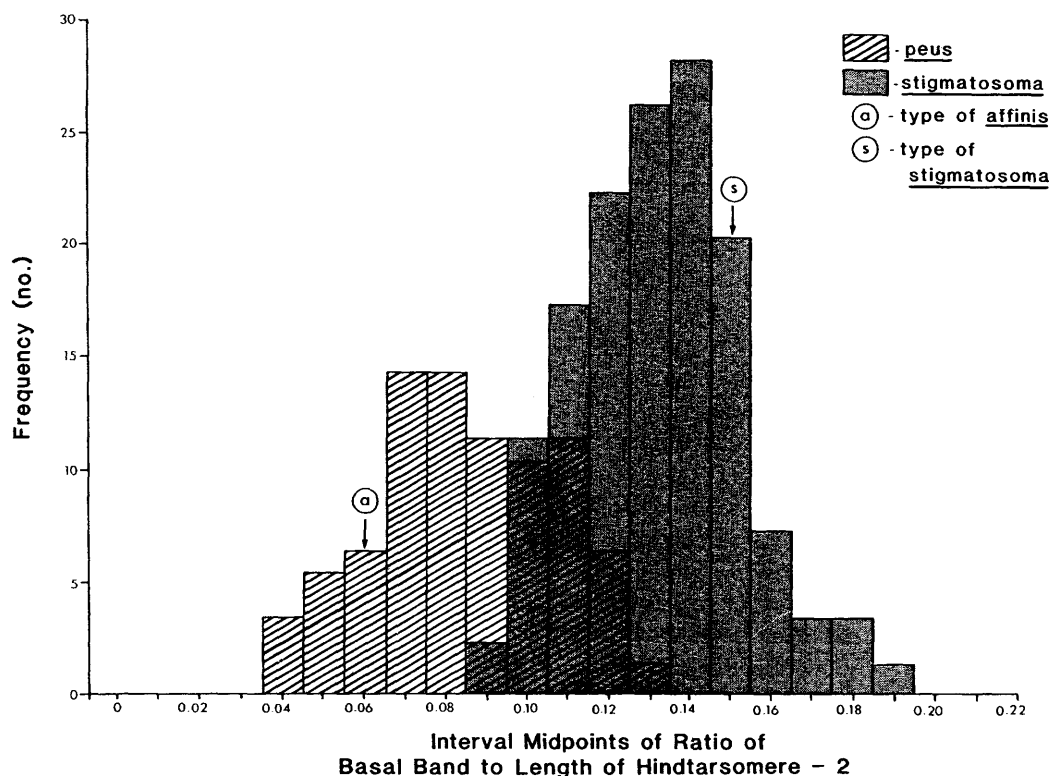


Fig. 12. Frequency distribution of the ratio of the width of the white basal band on hindtarsomere 2 to the length of hindtarsomere 2 on female *Culex peus* (n = 81) and *stigmatosoma* (n = 140) from the United States.

foretarsus; left midfemur, midtibia, and midtarsus; and left and right hindtarsomeres 4 and 5. Portions of abdomen rubbed, but scale patterns visible on all segments. Gravid condition of abdomen has stretched it in such a way that sternites hidden by paper of label, to which abdomen is glued.

Head: Palpomere 3 clothed in dark brown ($B_{99}Y_{70}M_{90}$) scales, broader on dorsal side than on ventral. Integument of each pedicel dark mesally. Scape about same color as lighter parts of pedicel. White decumbent scales of vertex and occiput narrow, flat, curved, and end in fine point. Broad scales on ocular suture and on postgena either truncate or rounded at tip. Erect, furcate scales on occiput and lateral portions of vertex. Integument of vertex medium brown ($B_{70}Y_{80}M_{80}$). Postocciput darkly pigmented on lateral edge and coronal suture.

Dorsum of thorax: Anterior promontory

with 16 narrow, curved, flat, pointed white scales. Lateral scutal fossal scales white, similar to scales on anterior promontory but broader. Median scutal fossal scales yellowish, slightly curved, and uniformly wide along length. Supraalar scales and lateral prescutellar scales white, narrow, flat, curved, and pointed. All undamaged setae alike. Integument dark brown ($B_{90}Y_{70}M_{80}$) with darker brown ($B_{99}M_{30}C_{60}$) acrostichal area. Scutellar scales narrow, curved, white, and pointed; lateral scutellar scale groups (7 scales on left, 5 scales on right) smaller than median scutellar scale group (greater than 30 scales). Each lateral scutellar lobe with sockets for 5 large setae arranged in row of 4 ventrally and one dorsally. Insertions of 6 median scutellar setae in same plane. Integument of scutellum lighter than that of prescutellum.

Pleuron: Integument of pleural sclerites

light brown ($B_{90}Y_{70}M_{40}$) or dark brown ($B_{90}Y_{70}M_{80}$). Positions and shapes of setae as illustrated (Fig. 10). Anteprenotum uniformly light brown; 11 broad, truncate, white scales on ventral portion. Postpronotum with narrow, curved, flat, pointed scales grouped on dorsal half of sclerite; most scales yellowish, dorsal few white; integument other than ventroposterior portion dark brown. Proepisternum light brown with white area just ventrad of setae. On mesanepisternum, postspiracular area with 8 broad, rounded, white scales; integument dark on post- and subspiracular areas, light on hypostigmal area. Mesokatepisternum with 21 broad, rounded, white scales; integument dark on most of ventral half and central portion of prealar knob; edges of prealar knob and of ventral half of mesokatepisternum light. Paratergite apparently lacks scales and setae (surface partially obscured by shrinkage of pleuron). Basalare, pleural wing process, and subalare with pale integuments. Two groups of broad, rounded, white scales on mesanepimeron; 12 scales in upper group, 11 scales in lower group. Integument dark in center, light on edges. Integument of mesokatepimeron, metepisternum, and metameron pale; mesomeron and mesotrochantin dark.

Wings: Scales of costa, subcosta, radius, and radius-one broad and either rounded or truncate; some broad scales paler than other scales. Clear membrane between veins minutely stippled. Knob of haltere clothed in minute pale scales; integument darker on knob than on stem.

Legs: Pale scales probably discolored with age (white on recently collected specimens of *Cx. peus*); others dark brown ($B_{90}M_{90}C_{90}$). Femora, tibiae, and tarsi illustrated (Figs. 1-6). Forecoxa with 14 small, round, white scales dorsally and inconspicuous scales ventrally colored like integument; on left side, ventral scales arranged in row below white scales, followed ventrally by loosely scattered scales; on right side, ventral group of scales more densely arranged than on left

side. Foretrochanter with a few scattered small, light-colored scales on ectal surface; integument light except for darkening at apical margin. Midcoxa with 5 broad, white scales on middle of anterior surface. Trochanter with six light, broad scales on mesal surface; integument of posterior apical margin darkly pigmented. Hindcoxa has scattered broad white scales on ectal surface. Hindtrochanter with scattered light scales on mesal and ventral sides; integument darkened apically on mesal and ventral sides.

Abdomen: Pattern of white and dark scales as illustrated (Fig. 9). Integument appears to darken posteriorly on each segment.

Culex stigmatosoma Dyar

Culex stigmatosoma Dyar, 1907: 123, Pasadena, California, USA, ♀, USNM; Stone 1958: 236, synonymized under *peus*.

Culex eumimetes Dyar and Knab, 1908: 61, Orizaba, Mexico, ♂, USNM. **New Synonymy.**

Additional descriptions.—*Cited as Cx. stigmatosoma*: Dyar 1907 (♀, L). Howard et al. 1912, 1915 (♀, ♂G*, L*); Dyar and Knab 1917 (♂G, L); Dyar 1922 (♀); Freeborn 1926 (♀, ♂, ♂G*, L); Dyar 1928 (in part *peus*: ♀, ♂, ♂G*, L*); Aguilar 1931 (♂G, L); Martini 1935 (♀); Ripstein 1935 (♀*, ♂, ♂G*, L*); Aitken 1942 (Aitken's identification tentative: ♀, L); Galindo and Kelley 1943 (♀, ♂G, L); Rees 1943 (♀, ♂G, L); Freeborn and Brookman 1943 (♀, L); Matheson 1944 (♀, ♂G, L); Pierce et al. 1945 (♀); Martinez Palacios 1950 (in part *peus*: ♂G*); Freeborn and Bohart 1951 (♀, ♂G, L*); Usinger et al. 1952 (♀, L); Martinez Palacios 1952 (♂G*); Stage et al. 1952 (♀, ♂G*, L); Lane 1953 (in part *peus*: ♀, ♂G*, L*); Carpenter and LaCasse 1955 (♀*, ♂, ♂G*, L*); Breland 1957 (L*); Bohart and Washino 1957 (2nd and 3rd instars L*). *Cited as Cx. eumimetes*: Howard et al. 1912, 1915 (♀, ♂, ♂G*, L*); Dyar 1918 (♂, ♂G, L). *Cited as Cx. peus*: Dodge 1963 (L); Myers 1964 (L*); Forattini 1965 (♀, ♂G*, L*); Cova Gar-

cia et al. 1966a (♀, ♂G*); Cova Garcia et al. 1966b (L*); Chapman 1966 (♀, ♂G, L); Bram 1967 (♀, ♂G*, L); Gjullin and Eddy 1972 (♀, ♂G*, L*); McDonald et al. 1973 (F); Bohart and Washino 1978 (♀, L*); Darsie and Ward 1981 (♀*, L*).

Material examined (all adult females).—California: Los Angeles Co.: Pasadena, holotype, 21 May 1906, Dyar and Caudell coll. no. C78. Arizona: Cochise Co.: Douglas, 23 Aug 1939, T. K. Ryan, 2 ♀; Lowell, 2 Aug 1939, T. K. Ryan, 3 ♀; Tombstone, 1 Sep 1939, T. K. Ryan. Pima Co.: Lake Sabino Canyon, 17 Aug 1963, J. Burger coll. no. 399, 2 ♀; Tucson, Jul 1920 (UAz); Tucson, 9 Feb 1941, R. A. Flock (UAz). Santa Cruz Co.: 2 mi. W. of Patagonia, 24 Aug 1954, W. A. McDonald. California: Alameda Co.: Oakland, I. McCracken: 24 Jul 1903, 6 ♀; 26 Aug 1903, 4 ♀. Clear Lake Co.: Rocky Point, 9 Nov 1947, H. P. Chandler. Contra Costa Co.: Richmond, 3 Oct 1947, W. W. Wirth. Humboldt Co.: Fortuna, 13 Aug 1948, W. W. Wirth. Kings Co.: Hanford, 8 Jul 1947, W. W. Wirth. Los Angeles Co.: Bixby, 25 Jul 1949; Chilao Flat, San Gabriel Mts., 18 Aug 1955, C. L. Hogue, 5 ♀; Malibu, 17 Sep 1952; Malibu Beach, 30 Nov 1963, T. J. Zavortink coll. no. 487, 9 ♀; Malibu Beach, 17 Dec 1963, T. J. Zavortink coll. no. 488; Pasadena, 21 May 1906, Dyar and Caudell coll. no. C78, 11 ♀; Reseda, 25 May 1955. Marin Co.: Ft. Barry, 20 Sep 1957, Carpenter et al., 8 ♀; Lucas Valley, 10 Sep 1957, Carpenter et al., 9 ♀. Mariposa Co.: Mariposa Co., 20 May 1960, A. R. Barr, 5 ♀. Merced Co.: Snelling, R. M. Bohart. Monterey Co.: Monterey, 10 Aug 1945. Orange Co.: Alyso Canyon, 10 Oct 1952, J. N. Belkin coll. no. 91, 16 ♀; Buelia Park, 22 Jul 1949, 6 ♀; Buena Park, 6 Jun 1949, 3 ♀; Buena Park, 22 Jul 1949, 2 ♀; Huntington Beach, 17 Jul 1949; Irvine Park, 24 Jun 1949; Laguna Beach, 4 Jun 1949; Orange Co., 23 Jul 1950; San Juan Capistrano, 29 Jul 1949; Santa Ana, 2 Jun 1949; Santa Ana, 22 Jul 1949, 2 ♀. San Diego Co.: San Diego, H. G. Dyar: 10–18 Apr 1916, coll. no. C, 4

♀; 17 Apr 1916, coll. no. C7, 2 ♀; 17 Apr 1916, coll. no. ABC, 2 ♀; 5 May 1916. Santa Clara Co.: Mt. View, 15 Jul 1903, I. McCracken; Stanford, I. McCracken: 26 May 1903, 5 ♀; 27 May 1903, 3 ♀; 8 Jul 1903; 10 Jul 1903; Stanford, 15 Jul 1961, A. L. Melander. Solano Co.: Vacaville, 4 Jul 1949, R. M. Bohart. Tulare Co.: Coffee Canyon, Tulare River, 29 Jul 1947, W. W. Wirth. Ventura Co.: Lake Sherman, 17 Sep 1952, J. N. Belkin. Oregon: Curry Co.: Harbor, 8 Oct 1944, W. W. Yates.

Diagnosis.—See diagnosis for *Cx. peus*.

Remarks.—The holotype (Stone and Knight 1957) of *Cx. stigmatosoma* is a female adult from Pasadena, California, collected by H. G. Dyar in 1906 and part of a long series of reared specimens. The type is in excellent condition and conforms completely to the diagnosis of *Cx. stigmatosoma*. Larvae and male genitalia from the same collection fit descriptions of these stages in recent literature.

The lectotype of *Cx. eumimetes* is a male selected by Stone and Knight (1957) from a series of 10 originally collected by Knab in 1908 in Orizaba, Mexico. The genitalia of the lectotype are not mounted, but the appearance of the specimen is consistent with other male *Cx. stigmatosoma*. The mounted genitalia from one of the other 10 specimens in the original series (no. 437.2) is definitely that of *Cx. stigmatosoma* based on the presence of seta d on the subapical lobe of the gonocoxite (Bram 1967).

DISCUSSION

Examination of specimens from the United States showed that adult females of *Cx. peus* and *Cx. stigmatosoma* are usually distinguishable by the proboscis band (usually incomplete in *Cx. peus*, complete in *Cx. stigmatosoma*), white scales on the palpi (absent in *Cx. peus*, present in *Cx. stigmatosoma*), a dark band in the middle of hindtarsomere 5 (usually absent in *Cx. peus*, present in *Cx. stigmatosoma*), and the width of the basal band on hindtarsomere 2 (nar-

rower in *Cx. peus*, wider in *Cx. stigmatosoma*). The only constant character for separating the female adults of the species was presence or absence of white scales on the palpi. The other three characters were useful, however, because very few individuals had more than one of the other 3 character states from the opposite species.

The holotype of *Cx. peus* (= *affinis*) was more similar to material formerly designated *Cx. thriambus* and dissimilar to the holotype of *Cx. stigmatosoma*. Adams (1903) described hindtarsomere 5 on *Cx. affinis* as all white, a character state present in the majority of *Cx. peus* (formerly *thriambus*) specimens and never present in *Cx. stigmatosoma*. Also, the holotype of *Cx. peus* lacks the white scales on the palpus always associated with *Cx. stigmatosoma* and never associated with *Cx. peus*. Finally, the width of the basal band on hindtarsomere 2 is within the range of *Cx. peus* and outside the range of *Cx. stigmatosoma* (Fig. 12). Adams (1903) implied that the proboscis band of the holotype of *Cx. peus* was complete, a condition more typical of *Cx. stigmatosoma*, but commonly present in individuals of *Cx. peus*.

Previous descriptions mentioned some of the characters used to identify the holotype of *Cx. peus*. The descriptions attributed a complete proboscis band to *Cx. stigmatosoma* and, with only two exceptions (Dyar 1921, Martinez Palacios 1950), an incomplete proboscis band to *Cx. peus*. Since *Cx. peus* often has a complete proboscis band (Table 1), the use of this character to separate *Cx. stigmatosoma* and *Cx. peus* has probably led to misidentifications. The presence of light and dark bands on the hindtarsus has also been treated in past descriptions and these descriptions agreed with the findings presented here, though none quantified either the proportion of *Cx. peus* with HT-5 all white or the width of the light hindtarsal bands. Some (Freeborn 1926, Ripstein 1935, Carpenter and LaCasse 1955, Bram 1967, and McDonald et al. 1973) de-

scribed the white scales on the palpi of female adult *Cx. stigmatosoma*, contrasting them with the lack of white scales on the palpi of *Cx. peus*. Significantly, McDonald et al. (1973) made this distinction between the species in the state where the holotype of *Cx. peus* was collected, lending support to the importance of this character in the type locality.

Geographic distribution of the species in Arizona and Utah supports the nomenclatorial changes made in this paper. *Culex stigmatosoma* is restricted to the southern part of Arizona in Yuma, Pima, Pinal, Santa Cruz, and Cochise counties (McDonald et al. 1973), well south of the type locality of *Cx. peus* in Oak Creek Canyon, Coconino County. Records of *Cx. stigmatosoma* in Utah (Dyar 1928) were apparently false, as the species has never been collected in the state despite extensive collecting (L. T. Nielsen, personal communication) and Dyar's original specimens are lost. *Culex peus*, on the other hand, occurs throughout much of Arizona, extending north through Coconino County (McDonald et al. 1973) all the way to Washington County in southern Utah (Nielsen and Linam 1963).

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